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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)
081468-0356680

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

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Application Number	Filed
10/590,352	May 21, 2007

First Named Inventor: Hans Van Der Laan

Art Unit	Examiner
2877	Tri T. Ton

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☑ attorney or agent of record.
Registration number 39,328

☐ attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

Signature

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Typed or printed name

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Telephone number

June 11, 2009
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.
Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

ATTACHMENT SHEETS TO PRE-APPEAL BRIEF REQUEST FOR REVIEW

I. APPEAL REJECTIONS

In the Final Office Action mailed February 11, 2009 (hereafter "Office Action"):

A. Claims 1-12, 16-19, 22-33 and 37-40 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent Application Publication No. 2003/0048458 to Mieher, *et al.* ("Mieher"); and

B. Claims 20 and 41 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mieher in view of U.S. Patent No. 6,917,901 to Bowley, Jr., *et al.* ("Bowley").

II. ARGUMENTS

A. Mieher teaches a model based on shape parameters, not regression analysis of calibration spectral measurement data.

Independent claims 1 and 22 each recite determining a mathematical model by using known values of at least one process parameter and by employing a multi-variant regression technique on the calibration spectral measurement data, the mathematical model comprising a number of regression coefficients. Appellant submits that the cited portions of Mieher fail to teach or disclose these features.

In particular, the Office Action relies upon paragraph [0080] of Mieher to allegedly teach employing a regression technique on the calibration spectral measurement data. [*See* Office Action, pgs. 3-4]. However, the cited portions of Mieher do not describe using regression in the claimed manner. For example, Mieher discloses that ***"the scatterometry data (e.g., measured spectra) is interpreted into shape parameter information. This may be accomplished using iterative regression techniques*** and/or by library matching techniques such as those previously described, i.e., match the measured spectra with libraries that link profiles with spectra." [Mieher, ¶ 80, emphasis added]. Converting spectral information to shape parameter information is not the same as determining a mathematical model for determining unknown values of process parameters of an object in a device manufacturing process.

The Advisory Action mailed May 13, 2009 ("Advisory Action"), however, states: "Shape parameter information of measurement spectra is an only type of spectral measurement data. In other words, spectral measurement data could be shape parameter information or could be

numeral parametric information." Appellant disagrees because these assertions are inconsistent with the express teachings of Mieher.

For example, with regard to shape parameters, Mieher discloses:

> The shape parameters are generally associated with the shape of a structure disposed on a wafer (e.g., a target structure or some portions of a device structure). The structure may be in the form of a grating that is typically periodic. The grating may be periodic in one direction (X or Y), as for example a line space grating, or it may be periodic in two directions (X and Y), as for example a grid space grating. The shape parameters may include line width (width at a specific height), side wall angle, height, pitch, top-profile (degree of top rounding or T topping), bottom profile (footing) and the like. The shape parameters may also include 3 dimensional shape information of structures that are periodic in both X and Y directions (as in grid space gratings).
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> [Mieher, ¶ 32, emphasis added].

On the other hand, with regard to measured spectra, Mieher discloses:

> The light emanating from the grating structure is typically scattered, reflected and/or diffracted at various orders, i.e., angles relative to the incident light. The characteristics of the scattered, reflected and/or diffracted light (e.g., intensity, phase, polarization, and the like) at the various orders is measured thereby forming a measurement signal or measured spectra.
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> [Mieher, ¶ 44, emphasis added].

As such, Appellant submits that it is apparent from the express teachings of Mieher that the shape of the structure (i.e., shape information) and light scattered, reflected and/or diffracted from the structure (i.e., measured spectra) are neither the same nor equivalent to each other. Instead, Mieher teaches that the measured spectra may be used to "generally reveal information about the shape of the grating structure." [Mieher, ¶ 44, emphasis added].

Thus, contrary to the Advisory Action's contention, Appellant submits the cited portions of Mieher neither recognize nor consider the shape information to be the same as spectra information. Accordingly, the cited portions of Mieher fail to teach determining a mathematical model by using said known values of at least one process parameter and by employing a multi-variant regression technique on the calibration spectral measurement data, the mathematical model comprising a number of regression coefficients.

For *at least* the foregoing reasons, Appellant submits that claims 1 and 22 are not anticipated by the cited portions Mieher. Indeed, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, "unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102." *Net MoneyIN, Inc. v. VeriSign, Inc. et al.*, Slip Op. pg. 17-18 (Fed. Cir., October 20, 2008).

The Advisory Action further states that "[Appellant] did not disclose that spectral measurement data, which must be numeric data or could not be shape parameter information data. More importantly, even if [Appellant] disclose that spectral measurement could not be shape parameter information data, the conflicts are shown on figure 4 of the current application; whereas, according to this figure calibration spectrum values are converted into shape information for comparing." Appellant disagrees for at least the following reasons.

Appellant submits that there is no conflict with Figure 4 of the Appellant's disclosure and the claimed invention. In describing Figure 4, Appellant expressly states that "measured calibration spectra, instead of theoretical spectral data, are directly used and compared with measured spectrum on an actual physical structure ..." [Appellant's Specification, ¶ 53, emphasis added]. Thus, contrary to the statements of the Advisory Action, Figure 4 does not show converting spectral information into shape information for subsequent comparison.

Moreover, even if one embodiment of Appellant's invention were to make use of shape data, the claims are expressly related to spectral data.

As such, Appellant submits that the Advisory Action's characterization of Figure 4 of Appellant's disclosure is erroneous.

By contrast, Appellant's claimed invention specifically uses a mathematical model based on spectral measurement data, rather than shape parameters, for subsequently comparing obtained spectral measurement data with calibration spectral measurement data. Indeed,

Appellant specifically discloses problems with the conventional approach – like taught by Mieher[1] – for converting measurements into shape information:

> Scatterometry is conventionally used to determine the values of process parameters, like focus and dose. Generally, however, several assumptions are made regarding the relationship between process parameters and scatterometry measurement parameters. Examples of such assumed relationships are a linear relationship between focus and side wall angle (the slope at the side of a line-shaped structure) and a linear relationship between dose and mid-CD (the width of a line-shaped structure at half its height). In reality, there may be no unique relationship between one single scatterometry measurement parameter and a process parameter like focus or dose. There may be, for example, additional effects, besides focus, that contribute to the characteristics of a side wall angle. By the aforementioned assumption, these effects would then be abusively interpreted as focus.
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> [Appellant's Specification, ¶ 17].

One advantage of Appellant's claimed invention is that no forehand knowledge of the optical properties of the materials is required to determine the process parameters. [*See* Appellant's Specification, ¶ 56].

Therefore, for *at least* the foregoing reasons, Appellant submits that each and every feature of claim 1 has not been shown by the Office to be anticipated by Mieher. In particular, the Office Action has not shown how the cited portions of Mieher allegedly teach "comparing the obtained spectral measurement data with the calibration spectral measurement data to determine the unknown value of said at least one process parameter for said object from said obtained spectral measurement data by employing said regression coefficients of said mathematical model."

Therefore, Appellant respectfully submits that a case of anticipation has not been established and that the cited portions of Mieher fail to disclose or teach each and every feature recited in claims 1 and 22. Claims 2-12, 16-19, 23-33 and 37-40 depend from claims 1 and 22,

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[1] *See* Mieher, ¶ 43 ("The test data may be produced using a variety of techniques. In most cases, the test data is produced by measuring the printed structures with a measurement system and converting the measurements into shape parameter values. Any suitable measurement technique may be used so long as the measurements obtained are capable of being converted into shape information, i.e., the raw measured data is converted into shape data. By way of example, CD-SEM, scatterometry, atomic force microscopy, cross sectional SEM techniques and the like may be used."); ¶ 44 ("Scatterometry is a measurement technique that is capable of characterizing multiple shape parameters of a pattern.")

respectively, and are therefore, patentable for at least the same reasons provided above related to claims 1 and 22 and for the additional features recited therein. Thus, Appellant respectfully requests that the rejection of claims 1-12, 16-19, 21-33 and 37-40 under 35 U.S.C. § 102(e) over Mieher should be withdrawn and the claims be allowed.

Further, Appellant submits that the cited portions of Bowley do not overcome the deficiencies of Mieher. The Office only relies upon Bowley to allegedly show a support structure configured to support a patterning structure and a substrate table configured to hold the substrate.

Therefore, Appellant respectfully submits that a *prima facie* case of obvious has not been established and that the cited portions of Mieher, Bowley, or a proper combination thereof, fail to disclose or otherwise render obvious each and every feature recited in claims 1 and 22. Claims 20 and 42 depend from claims 1 and 22, respectively, and are therefore, patentable for at least the same reasons provided above related to claims 1 and 22 and for the additional features recited therein. Thus, Appellant respectfully requests that the rejection of claims 20 and 41 under 35 U.S.C. § 103(a) over Mieher in view of Bowley should be withdrawn and the claims be allowed.

III. CONCLUSION

Therefore, it is respectively requested that the panel return a decision concurring with Appellant's position and eliminating the need to file an appeal brief because there are clear legal and/or factual deficiencies in the appealed rejections.